REMARKS

Claims 1 to 19, 21 to 24, and 34 are in the case.

Non-elected claims 26 to 33 were cancelled previously, and claims 20 and 25 are cancelled by the present amendment.

Election/Restrictions

Applicant affirms the election made by telephone on September 21, 2006 and identified in the Office Action at the bottom of page 3 whereby claims 2 to 5 and 10 and 11 are withdrawn from further consideration.

The claims under consideration following amendments and cancellations made by the present amendment are claim 1, claims 6 to 9, claims 13 to 19, claims 21 to 24, and claim 34.

Claim Rejections – 35 U.S.C. 112

Claim 1 has been amended in response to the claim rejections under 35 U.S.C. 112, and the amendments in claim 1 are believed to overcome all objections. These amendments were previously discussed with the Examiner in a telephone conversation.

Thus, it is now made clear that there are no conditions where R_5 is present, and it is made clear that defining R_5 as being absent means that there is a P – P bond.

In response to the indications as to contradiction at lines 25 and 28, this was previously discussed by telephone with the Examiner, and the claim has been edited accordingly particularly by introduction of "or" between the two basic sets of definitions. The first definition is concerned with embodiments in which X is absent and the second definition is concerned with embodiments in which X is an inorganic or organic anion. Y_1 is defined differently in these two definitions.

As to the final objection, the term "said" was considered to make it clear that compound A in the bleaching was also the compound employed in the stabilizing. In any event, claim 1 has been edited to more clearly relate the compound A at the end of the claim with the compound A at the beginning of the claim.

The amendments are believed to overcome the objections under 35 U.S.C. 112, and favourable consideration is requested.

Rejections under 35 U.S.C. 103

By the present amendment, the claims have been modified to confine them to the bleaching and stabilization of lignocellulosic pulp in an aqueous medium. The language

"aqueous medium" is taken from, for example, claim 21 and, in essence, claim 1 now includes the feature previously set forth in now cancelled claim 25.

In contrast to bleaching and brightness stabilization of lignocellulosic pulp in an aqueous medium, the reference Davidson et al represents a study of photoyellowing of bleached paper when such bleached papers are irradiated in aqueous solutions containing different reducing agents. The teaching at page 421 with reference to Table 1 is that certain reagents bleach the paper and that other reagents retarded photoyellowing. THPC was among the agents that are indicated as retarding the photoyellowing but not bleaching the bleached paper.

At best, Davidson et al teaches or demonstrates that THPC may stabilize the brightness of a previously bleached CTMP paper, when the THPC is impregnated into the paper and the paper is irradiated in dry state (Table 3), or when the paper is immersed in a solution of THPC and then irradiated (Table 1).

The description of the results at page 421 of Davidson et al appears unequivocal, namely, that Blenkit D, Rongalit C and potassium metabisulphite bleached the paper (which was already a bleached paper), and that the other agents (this includes THPC) retarded the photoyellowing. A clear distinction is made by Davidson et al between the two classes of reagent, and if anything, Davidson et al would teach that THPC does not have a bleaching function.

In the Office Action, in the "Response to Arguments" bridging pages 4 and 5, and also in the Claim Rejections commencing at page 6, reliance has been made on an attempt to interpret the results in Fig. 4 of Davidson et al at page 427.

Davidson et al indicates that Fig. 4 (and also Fig. 3) demonstrates the rate of yellowing as a function of time for different compounds (see page 424 of Davidson et al) and expressly indicate that the results show:

> "The extent to which the reducing agents retard the yellowing, is not surprisingly, dependent on the amount of reducing agent applied to the paper."

Davidson et al makes no finding with respect to a bleaching effect for Figs. 3 and 4. Fig. 4 demonstrates that the change in brightness index, i.e., yellowing, of a bleached paper impregnated with THPC in the dry state (i.e., not in an aqueous medium) parallels the change in brightness index of a control bleached paper not impregnated with THPC.

In the Office Action, reliance appears to be made on an apparent discrepancy in Fig. 4 wherein the bleached papers impregnated with THPC are shown as having a starting

brightness index of about 75, whereas the control bleached paper is shown as having a lower starting brightness index of the order of 71 or 72. No explanation for this is provided, but Table 1 of Davidson et al indicates that the brightness index of the starting untreated paper was 75. It would appear that either there is an error in Fig. 4 with reference to the starting brightness of the control bleached paper which, as shown, is inconsistent with the description of such paper in Table 1, or as a matter of convenience and to better illustrate the parallel nature of the change in brightness index, the starting point for the plot for the control paper in Fig. 4 was deliberately lowered slightly for convenience in the drawing.

In any event, Davidson et al is totally silent on this point and if, in fact, the impregnation with THPC had been found to increase the brightness of the bleached paper as concluded in the Office Action, it is highly surprising that Davidson et al did not comment on this finding and that they, in fact, identified THPC as having no bleaching effect but rather having an effect of retarding photoyellowing (summary of results at page 421 of Davidson et al).

With respect, there is no teaching express or otherwise in Davidson et al of a bleaching of THPC, and the objection is based on an attempt to interpret Fig. 4 of Davidson et al in a manner which is, in fact, inconsistent with what is expressly stated by Davidson et al.

Furthermore, any teaching of Davidson et al is confined to bleaching of papers which have been prebleached. There is no showing whatsoever that Davidson et al recognized that THPC might bleach a prebleached paper, and still less that it might bleach a lignocellulosic pulp (as distinct from a paper) as now required by the claims, and still less that this bleaching would occur in an aqueous medium as now required by the claims. The data in Fig. 4 relate to dry state conditions, and indeed Davidson et al expressly teaches that while papers that were impregnated showed some photostability when irradiated in the dry state, this was not shown when irradiated in aqueous solution (see abstract, page 419, of Davidson et al). This would further teach away from the process of the present invention carried out in an aqueous medium.

In the light of the foregoing, reconsideration of claim 1 as now presented is requested, which claim is believed to fully distinguish over any teachings of Davidson et al, express or otherwise.

The continued reliance on Bowdery et al is not understood. The phosphonium salts in Bowdery et al are employed to kill bacteria and destroy enzymes in hydrogen

peroxide which contains such bacteria and enzymes, which hydrogen peroxide is intended for bleaching of pulps.

There is no teaching anywhere in Bowdery et al that THPS can be employed for bleaching. The clear teaching, for example, at page 1, is that THPS and its parent THP:

"are more effective than glutaraldehyde at killing catalase-producing bacteria."

The problem to which Bowdery et al is directed is that a catalase produced by bacteria found in pulp and paper mills consumes hydrogen peroxide which is employed for bleaching, thereby lowering the bleaching. It is unequivocal that the bleaching in Bowdery et al is by means of the hydrogen peroxide, not by means of the THP or THPS, employed as an alternative to glutaraldehyde, as a biocide to kill the catalase-producing bacteria. Claim 1 recites that the bleaching is with the phosphine or phosphonium compound and also that the stabilizing of the brightness in the bleached pulp is with the compound.

Paragraph 3 at page 4 of Bowdery et al expressly referred to is unequivocal in indicating that what was under investigation was the ability of THPS to reduce the bacteria (which produced the catalase) as compared with the ability of glutaraldehyde to reduce such bacteria.

In paragraph 4 of page 5 of Bowdery et al, also expressly referred to in the Office Action, there is described the addition of the hydrogen peroxide, which is the classic bleaching agent described in Bowdery et al for bleaching pulp. There is not even a hint that THPS might function to bleach pulp.

Reconsideration is requested.

With respect, there is no basis as set forth at page 7 of the Office Action for finding that it would be obvious to employ the compound of formula A described by Bowdery et al in the bleaching and brightness stabilization method of Davidson et al. What is taught by Bowdery et al is to employ such compounds of this class to kill catalase-producing bacteria so as to improve the efficiency of bleaching with hydrogen peroxide.

Bowdery et al does not teach that it reduces peroxide species. Bowdery et al teaches that it kills bacteria which affect hydrogen peroxide. Bowdery et al employs THPS or THP to destroy catalase-producing bacteria or catalase enzymes that can cause decomposition of hydrogen peroxide in subsequent hydrogen peroxide bleaching of pulps. Although THPS can be added to the pulping liquors (i.e., the water used for pulp bleaching with hydrogen peroxide) or to the pulp/water sample prior to the addition of hydrogen peroxide and testing of the breakdown of hydrogen peroxide (pg. 5, paragraphs 3 and 4), no

bleaching of the pulp by THP or THPS in such pulp/water sample was claimed or observed. It is well known that aqueous solutions of hydroxymethyl phosphonium salts such as THPC are sensitive to oxidants [Frank, A. W., Gaigle, D. J. and Vail, S. L., Chemistry of Hydroxymethyl Phosphorus Compounds, Part II. Phosphonium Salts, Textile Res. J., 52(11): 678-692 (1982)]. Adding hydrogen peroxide to aqueous solutions of THPS will readily destroy THPS (i.e., oxidation of THPS by hydrogen peroxide). Thus, even though the catalase destruction observed by Bowdery et al does not indicate that THPS is not present during subsequent hydrogen peroxide bleaching, the prior art teaches that THPS is not compatible with hydrogen peroxide and no one will construe pulp bleaching with THPS in the presence of hydrogen peroxide.

Furthermore, Davidson et al suggests that THPC is a source of trivalent (or "tervalent" as the Examiner referred to) phosphorus compound (i.e., THP) which is able to reduce peroxidic species and thus destroy peroxidic species (pg. 431, lines 8-15). This suggestion only pointed out to the incompatibility of hydrogen peroxide with THPC which had already been known in the prior art of Frank et al (see above). Davidson et al's prior art does not add anything new to Bowdery et al's prior art, and vice versa.

In that claim 1 inventively distinguishes over Davidson et al and Bowdery et al, dependent claims 6 to 9 and 13 likewise distinguish. Davidson et al and Bowdery et al fail to suggest these claims.

With respect to claim 14, Bowdery et al discloses THPS for a completely different purpose unrelated to that in the present invention.

With respect to claim 16, the claims in the present application, including claim 16, are confined to a pulp. Davidson et al does not teach pulp. Davidson et al teaches bleached papers, and the references to pulp in Davidson et al are merely identification of the class of pulp employed to make the bleached papers.

The same applies to claim 18.

Claim 20 has been cancelled.

With respect to claims 21 and 22, these are concerned with bleaching and brightness stabilization, and this is not taught by Davidson et al. Since Davidson et al does not teach bleaching and brightness stabilization, it cannot teach optimization of process conditions for such bleaching and brightness stabilization.

With respect to claim 23, reliance is made on the fact that claim 1 distinguishes over the reference. Claim 23 merely recites preferred embodiments of the method of claim 1.

Claim 25 has been cancelled, the subject matter having effectively been introduced into claim 1.

Claims 17, 19, 24, and 34 stand rejected based on a combination of Davidson et al, Bowdery et al, and Liebergott et al. Liebergott et al does not overcome the basic deficiencies of Davidson et al and Bowdery et al. Davidson et al is concerned with bleached papers, not with pulp, still less the classes of pulp in claim 17.

Similar comments apply to claim 19. Davidson et al is concerned only with bleached papers and contains no teaching relevant to bleaching of pulp. The same applies to Bowdery et al.

Claims 24 and 34 recite particular and preferred embodiments and are patentable for the reason that the parent claim 1 is patentable. Liebergott et al does not overcome the deficiencies of the principal references with respect to claim 1.

In the light of the foregoing, favourable consideration of the claims as now presented is requested.

Allowable Subject Matter

The allowability of claim 15 is acknowledged. However, at this stage, the claim is maintained in dependent form. The allowability of claim 15 is not affected by the amendments which effectively narrow the scope of claim 1 to which claim 15 refers.

Prior Art of Record

The prior art made of record has been reviewed but does not overcome the deficiencies of the references relied upon.

The application is believed to be in condition for allowance, and early and favourable action would be appreciated.

Respectfully,
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